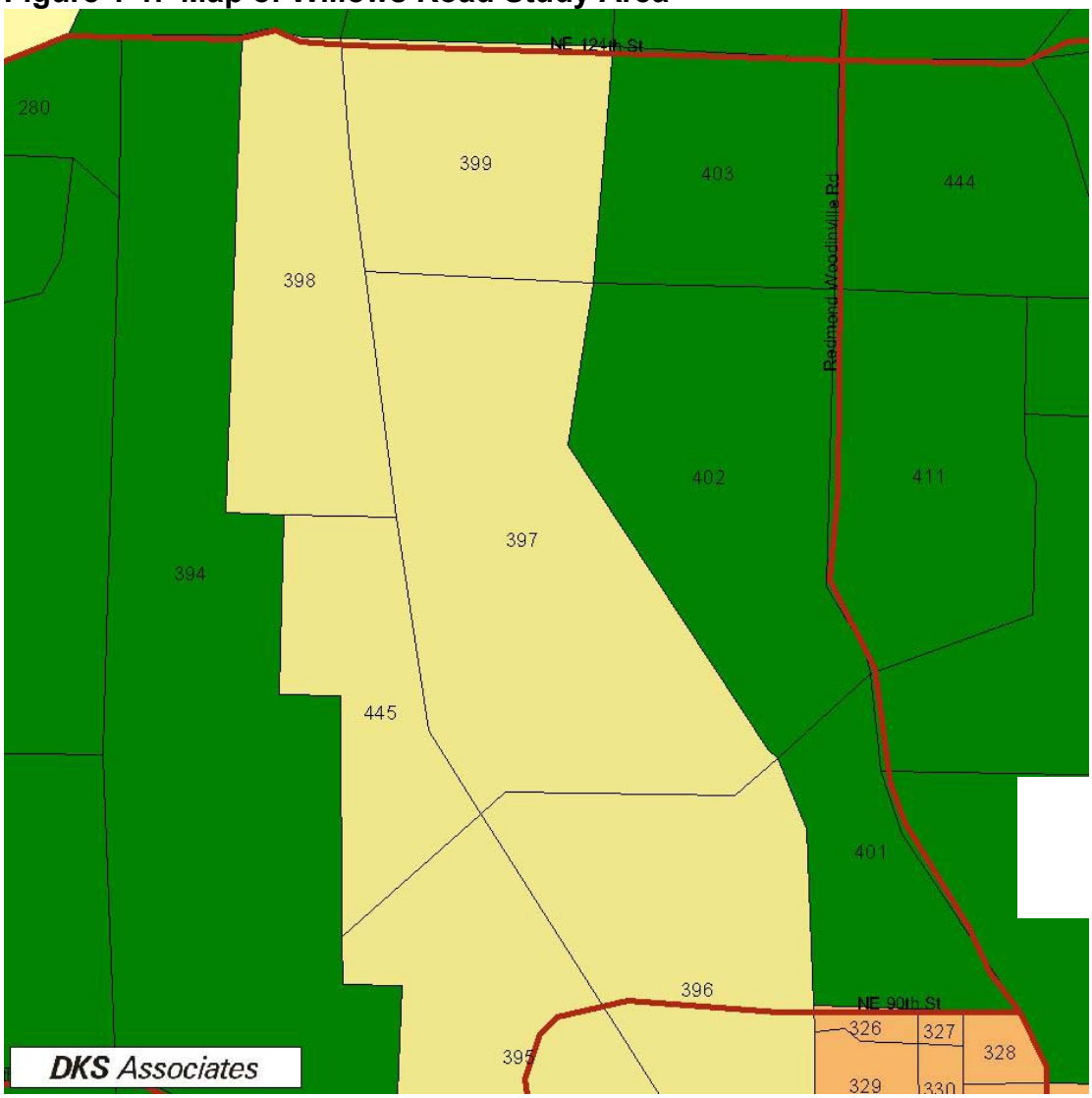
Willows Road - Redmond

1.0 Setting and Physical Characteristics

1.1 Location

The focus of this case study area is the Willows Road corridor in Redmond. It extends from downtown Redmond at the intersection of Willows Road with NE Redmond Way (SR 908) and goes north to NE 124th Street. Willows Road runs along the west side of the Sammamish Valley, which historically has been farmed. The valley area to the east of the roadway is subject to development limitations due to flooding, wetlands, seismic hazards, and ground water recharge. The Willows Road Corridor consists of small hills immediately west of Willows Road. High technology industries are located in this pastoral setting. The case study area boundaries are illustrated in Figure 1-1.

Figure 1-1. Map of Willows Road Study Area



1.2 Land Use Character and Mix

Manufacturing, research and development, light industrial, wholesaling and similar uses are encouraged on both sides of Willows Road south of the Puget Power right-of-way (located just north of NE 95th Street) and on the west side only to NE 124th Street. Most uses in the Willows Corridor consist of high technology industries. The business park portion permits retail and services only as part of building occupied by office or business uses.

The Willows Road corridor has sensitive areas that limit development of specific areas, including critical erosion hazards, landslide hazards, streams, wetlands and aquifer recharge areas along the road. Developments within the Willows Neighborhood which are north of the Puget Power right-of-way have to comply with stated design policies which include: (1) no more than 60 percent of the site may be covered by impervious surfaces; (2) pedestrian and bicycle links shall be provided to Willows Road; (3) new Business Park and residential development along Willows Road should use existing accesses or the streets in the Willows Road Neighborhood Street plan, rather than building new streets or accessways.

The land to the west of Willows Road is designated as a Research & Development/ High Technology /Manufacturing Park from NE 124th Street to the intersection with Redmond Way/NE 80th Street, the entire length of the corridor. The slopes immediately behind the business park remain forested. The land east and west of Willows Road from Redmond Way to NE 102nd is zoned manufacturing. The land to the east of Willows Road from NE 100th Street to NE 124th Street was changed to Urban Recreation and Open Space from previous designation of Agricultural in the 1995 comprehensive plan update. The Willows Road corridor is in the Willows/Rose Hill Neighborhood Plan that totals about 2.1 square miles, or a little over 10 percent of Redmond's land area. The neighborhood includes 2.2 million square feet of office, industrial, and retail space along the west side of Willows Road where about 5,200 people are employed.

1.3 Access to Freeways and State Facilities

NE 124th Street (and other east/west principal arterials) provides access from Willows Road to Interstate 405, located about a one mile to the west of and parallel to Willows Road. Access to SR 520 is reached at the southern terminus of Willows Road via SR 908 and West Lake Sammamish Parkway.

1.4 Roadway Network

The transportation elements of the City's 1995 Comprehensive Plan established a hierarchy of streets serving the City. This hierarchy is based on the desired function of the facility to serve local traffic, through traffic, or a combination of local and through traffic. The principal arterials provide access to/from the City and the freeways and connect activity centers. The minor arterials provide connections to the principal arterials and connections with higher density activity centers. These connections are supplemented with a system of collector arterials. The City's planned arterial system includes streets that are up to 5 lanes wide.

The principal arterials in the Willows area are the two roadways at the termini of both ends of Willows Road, NE 124th Street and NE Redmond Way (SR 908) and NE 90th. The only minor arterial is Willows Road. NE 116th Street that intersects Willows Road is classified as a collector by the City of Redmond.

1.5 Transit Services

1.5.1 Existing Transit Service

Route 291 provides the only service on Willows Road. There is but one bus route that provides service directly on Willows Road. Route 291 provides both fixed and (limited) variable routing, between the Redmond P&R and Kingsgate P&R. Route 291 provides 30 minute peak hour service on weekdays.

Passengers may wait at any bus stop along the route for regularly scheduled route trips. There are total of nine 30-minute headway fixed service routes each day; four in the morning during the peak period and five in the afternoon during part of the peak period. In the morning service from the Kingsgate P&R arrives at the north end of Willows Road and NE 124th at 6:07 am to 8:37 am and in the afternoon from 3:33 pm until 5:33 pm. In the other direction from the Redmond P&R, the first bus arrives at Willows NE and NE 124th at 6:55 am to 8:25 am; and from 3:31 pm 5:31 pm.

Additionally, reservations can be made at least two hours in advance, and one may make reservations for 30 days at a time up to 30 days in advance. Reservations are taken on a first-come, first-served basis. This service is provided in limited areas between Redmond Town Center and Lake Washington Technical College. Only a limited number of off-route deviations can be made on any given trip.

Passengers may be asked to board/deboard at a location a block or more from their origin or destination. On the west side of Willows Rd NE, service will deviate upon requires from the fixed routing in the northbound (to Kingsgate) direction only. The daily ridership was estimated at 98 in the Fall of 2001.

In addition, ST Route 540 (Bear Creek-Redmond P&R-U District Express) crosses Willows Road at NE 90th; allowing passengers on and off. Service is 30-minute headway from about 6 am to 9:30 pm (heading to Redmond); and from about 7 am to 10:15pm (heading to Kirkland and the UW). The route travels from Bear Creek P&R, to Redmond P&R, across Willows Road on to the Kirkland Transit Center, South Kirkland P&R, Evergreen Point Freeway Station, and onto the University of Washington campus. Other routes that cross through the area south of NE 90th, in the triangle piece of land area bounded by Willows Road, NE 90th, and the Sammamish River Slough, are as follows: #230, 232, 250, 253, 254, 266, 540, 545, and 546. Many of these routes travel on 154th Avenue NE and turn onto NE 80th St or NE 90th St. The daily ridership total is 409 for these routes.

1.5.2 Forecast for 2030 Transit Service

The PSRC/Trans-Lake model was used to forecast the number of transit routes in the case study area for both the base and future conditions. As Table 1-1 and Table 1-2 illustrate, the Willows road area is expected to get higher frequency bus service in the future, especially during the peak hours.

Table 1-1. Number of Routes

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				21	**21**
	2030			13	5	**18**
Mid-Day	2000				21	**21**
	2030			9		**9**

Table 1-2. Frequency of Service

Time Period	Year	Rail	Ferry	High Bus	Low Bus	Total
AM Peak	2000				34	**34**
	2030			60	10	**70**
Mid-Day	2000				32	**32**
	2030			36		**36**

1.6 Parking Supply, Availability and Price

The Willows Road analysis area is dominated by light industrial and business parks located along the corridor and to the east. Outside of this area, the zone is predominantly residential homes, condominiums, and apartments. At the southern section of the study area, land use is more intense and businesses are more closely spaced. To the north, land uses include business parks, located in Zones 398 and 445 (west of Willows), while TAZ 397 consists of a golf course, and Zone 399 is in agricultural use at this time. All parking is free in the area.

Total off-street, non-residential parking capacity is 15,549 spaces. As shown in Table 1-3, the total weekday, mid-day demand was found to be 7,412 vehicles, or 48 percent.

The parking demand is the greatest in BKR[1] zone 398 (see Figure 1-1); this zone includes General Dynamics and Medtronic corporations. Several new buildings exist in the industrial parks that were

[1] Bellevue-Kirkland-Redmond Model

vacant at the time of the survey. In addition, vacant offices existed inside the industrial parks where the parking allotted to the vacant buildings could not be differentiated from the occupied buildings' parking.

Table 1-3. Parking Supply and Demand by Type

	Parking Type			
	Retail	Office	Other	Total
2000 Supply	175	13,464	1,910	**15,549**
2000 Demand	54	6,986	372	**7,412**
2000 D/S Ratio	0.31	0.52	0.19	**0.48**
2030 Supply				**18,958**
2030 Demand				**11,948**
2030 D/S Ratio				**0.63**

When collecting parking costs, the PSRC/Trans-Lake baseline model assumes a relatively high parking cost in many parts of the region. Then, in the implementation of the model, the parking costs are lowered for many users to reflect that many users don't pay for the full price of parking. In the implementation of TEEM, the forecast parking costs were assumed to be one-half of the baseline PSRC/Trans-Lake model to account for people whose parking costs are subsidized. The resulting parking costs are shown in Table 1-4.

Table 1-4. Average Parking Costs from the PSRC/Trans-Lake Model

	Parking Costs	
	2000	2030
Drive Alone	$0.00	$1.12
Carpool	$0.00	$0.67
Vanpool	$0.00	$0.00

1.7 Pedestrian and Bicycle Facilities

There are bike lanes (class II) along Willows Road from NE 95th to NE 116th. There are lanes planned from NE 116th to NE 124th Avenue. On the City's Bike Map, the stretch of Willows Road from NE 95th to Redmond Way is identified as a road to use with caution. The high traffic and turning movements on Willows Road, especially at peak times, is not favorable to cycling activity.

Sidewalks are located along portions of Willows Road; along other portions pedestrians must walk along the shoulder which varies in width and condition. Signalized crosswalks are located only at the traffic lights At NE 116th Avenue and NE 95th Avenue.

At recent neighborhood plan meetings, those who work in the Willows Road Business Corridor expressed concern about inadequate pedestrian safety. Initial suggestions included constructing additional sidewalks along Redmond Way and crosswalks along Willows Road. As mentioned, currently cross walks across Willows Road are located only at the intersections with signal lights. However, the City of Redmond recently adopted standards that there will be no mid block crossings on arterials.

The City of Redmond's Park, Recreational and Open Space (PRO) plan identifies four proposed trails within the Willows/Rose Hill neighborhood: a north-south trail along the Puget Sound Energy corridor, an extension of the east-west PSE/City of Redmond trail from Willows Road to 132nd Avenue NE, a

new trail from the PSE corridor east along NE 124th Ave NE, and a trail along the railroad. The PRO plan was updated in 1997 and is updated every five years.

2.0 Population and Employment Characteristics

The following tables provide more information about population and employment characteristics.

2.1 Population

The size and population for both 2000 and 2030 of the study are is given in Table 2-1. The population is expected to drop over the next thirty years, as housing development will occur primarily in other parts of the county. Most of the growth in the Willows corridor will be in employment.

Table 2-1. Background Model Information

	2000	2030
Size (sq. miles)	2.14	
Population	2,175	1,891

2.2 Employment

The main types of employment in the study area are in office and manufacturing. As shown in Table 2-2, retail is expected to decline (although it is only a small part of the total employment) while office employment increases by more than 4,000 in the next thirty years. For the study, firms were divided into four groups as shown in Table 2-3. This pattern is forecasted to continue in 2030. The growth into the future is expected to be occurring in all size employers.

Table 2-2. Employment by Type

	Model Employment	
	2000	2030
Retail	185	71
Office	5,583	9,918
Other	6,832	7,329
Total	**12,600**	**17,318**

Table 2-3. Employee Data by Size of Employer

	Number of Employees				Grand Total
	0-49	50-99	100-499	500+	
2000	4,115	1,746	3,396	3,343	12,600
2030	5,656	2,399	4,667	4,595	17,318

2.3 Characteristics by Transportation Analysis Zone (TAZ)

Table 2-4 lists the transit level of service definitions that were used for each TAZ, while Table 2-5 illustrates the changes in land use characteristics that are expected for each TAZ in the study area. The zones that currently get high transit service are the zones that border Downtown Redmond, where transit service is much greater than in the Willows Road corridor. Given the present and future emphasis of light industrial and office uses in the area, the mix of uses in the area remains low. Table 2-6 gives the

population, employment and trips by local area TAZ for the study area. These characteristics were summarized in earlier sections. In general, they show a declining population in most zones, with increasing "other" employment leading to more attraction trips. Table 2-7 shows future population and employment by transit level of service. In the future, more resident and employee trips are expected to be in zones with high transit service.

Table 2-4. Transit Level of Service Definitions

Transit Service	Definition
High 1	At least one (1) rail route or five (5) or more high frequency routes
High 2	Four (4) high frequency routes or at least fifteen (15) total routes
Medium 1	Three (3) high frequency routes or at least ten (10) total routes
Medium 2	Two (2) high frequency routes or at least five (5) total routes
Low 1	At least two (2) total routes
Low 2	Less than two (2) total routes

Table 2-5. Land Use Characterizations

	Transit Service		Mixed-Use		Density	
TAZ	2000	2030	2000	2030	2000	2030
395	High 2	High 1	Low	Low	Low	Low
396	High 2	High 1	Low	Low	Medium	Medium
397	Low 1	Medium 2	Low	Low	Low	Low
398	Low 1	Medium 2	Low	Low	Low	Medium
399	Low 1	Low 1	Low	Low	Low	Low
445	Low 1	Low 1	Low	Low	Medium	High

Table 2-6. Population, Employment and Trips

		Population and Employment						Home Based Work Person Trips			
	Area	Population		Retail Employment		Other Employment		Productions		Attractions	
TAZ	sq. miles	2000	2030	2000	2030	2000	2030	2000	2030	2000	2030
395	0.403	1,883	1,382	59	71	1,703	1,924	1,651	1,982	2,222	2,545
396	0.424	284	507	126	0	5,768	6,465	397	470	7,026	8,958
397	0.566	0	0	0	0	64	67	0	0	179	228
398	0.284	9	0	0	0	1,970	4,637	6	0	2,279	4,947
399	0.263	0	3	0	0	0	0	0	2	0	0
445	0.196	0	0	0	0	2,910	4,153	0	0	3,292	4,238

Table 2-7. Population Employment by Transit Service

		Transit Service Level						Total
		High 1	High 2	Medium 1	Medium 2	Low 1	Low 2	
Transit Service	2000 Base	0	2	0	0	4	0	6
	2030 Base	2	0	0	2	2	0	6
Population	2000 Base	0	2,167	0	0	9	0	2,175
	2030 Base	1,888	0	0	0	3	0	1,891
Total Employment	2000 Base	0	7,656	0	0	4,944	0	12,600
	2030 Base	8,460	0	0	4,705	4,153	0	17,318

3.0 Travel Behavior Inventory

The data in this section provides information about travel behavior in the study area.

Some background information is presented below:

- The PM peak hour trip traffic on Willows Road, traveling northbound, picks up a number of pass through vehicles at NE 90th Street as follows: 1880 vehicles enter at Redmond Way intersection with Willows Road; just north of the intersection with NE 90th Street 2811 vehicles travel north; north of NE 116th Street 3898 vehicles travel to intersection with NE 124th Street.
- The average daily traffic (ADT) volume on Willows Road at NE 116th Street is approximately 11,100 northbound and 10,799 southbound. Near the intersection with NE 90th Street, more than 27,000 the ADT is 13,987 northbound and 13,181 southbound.
- Roadway Connectivity is an issue in this area. Willows Road connects to only five roads including: e/w on NE 124th Street, east only on NE 116th Street, east only on NE 95th Street, e/w on NE 90th Street, and e/w on Redmond Way.
- Over the years, discussions have been held on extending NE 100th or NE 104th Street west from Willows Road to 132nd Avenue NE. The residents of NE Rose Hill have traditionally opposed this idea. Redmond's City Council voted to eliminate extension of NE 100th Street from the Transportation Facility Plan when they adopted the City's Comprehensive Plan in 1995. At this time of this report, the City of Redmond[2] has no plans to construct this street extension.

3.1 Person and Vehicle Trips

The person and vehicle trips for the study area employees and residents are illustrated in Table 3-1 (from the TEEM model). The area is expected to see an increase of 6,000 person trips, but an increase of only 4,000 vehicle trips.

Table 3-1. Commute Trips

	Person Trips		Vehicle Trips	
	2000	2030	2000	2030
Study Area Employee	14,998	20,917	13,339	17,278
Employed Residents	2,053	2,454	1,830	1,785

3.2 Vehicle Miles Traveled

The vehicle miles traveled to work in Willows Road by employees is illustrated in Table 3-2. As would be expected, users of vanpools drive the farthest. This illustrates the commonly assumed condition that people who live farther away from work are more willing to use a vanpool.

[2] The Rose Hill/Willows Neighborhood Plan

Table 3-2. Average Vehicle Miles Traveled by Mode

Mode	Vehicle Miles Traveled to Work
Drive Alone	15
Carpool	19
Vanpool	25
Transit	18
Non-Motorized	0

3.3 SR 520 Corridor Trips

Just over 1.2 percent of the PM Peak vehicle trips to and from Willows Road cross the SR 520 bridge. As shown in Table 3-3, a much higher percentage of vehicle trips heading to Willows Road use the bridge. At 529, Willows Road trips comprise 1.3 percent of total bridge traffic during the PM peak period.

Table 3-3. Study Area Vehicle Trips Related to SR 520 Corridor

	From the Study Area	To the Study Area	Total Trips
PM Peak Trips	37,572	5,478	43,050
Study Area Trips Crossing SR 520 Bridge	237	291	529
Percent of Case Study Trips Crossing SR 520 Bridge	0.6%	5.3%	1.2%

3.4 Average Vehicle Occupancy for Commute Trips

The average vehicle occupancy for vehicle trips is shown in Table 3-4.

Table 3-4. Corridor Related Vehicle Trips

	Average Number of People
Drive Alone	1.00
Carpool	2.08
Vanpool	8.76

3.5 Historical CTR Mode Shares by Year

The vehicle miles traveled to work by employees in the Willows Road corridor is illustrated in Table 3-5. Users of carpools have increased from 10 percent to 15 percent over the past 8 years.

Table 3-5. Mode Share for CTR Employers

	Number of Employers	Mode Choice					
		Drive Alone	Carpool	Vanpool	Transit	Non-Motorized	Other
1993	6	87%	10%	1%	0%	1%	0%
1995	8	83%	13%	2%	1%	1%	0%
1997	11	83%	13%	2%	0%	2%	1%
1999	13	83%	11%	3%	1%	1%	1%
2001	14	80%	15%	2%	1%	1%	0%

4.0 History with TDM and Land Use Strategies

Using information from the Washington State CTR data base, the following tables were developed for the case studies.

Table 4-1 lists the percent of Willows Road employers who stated that they either did or did not offer a TDM program.

Table 4-1. Percentage of CTR Employers Who Offer a Program

		Year			
		1995	1997	1999	2001
CWW Program	Yes	100%	100%	0%	0%
	No	0%	0%	100%	100%
Telecommuting	Yes	67%	38%	30%	50%
	No	33%	63%	70%	50%
Flex Time	Yes	100%	88%	80%	81%
	No	0%	13%	20%	19%
Guaranteed Ride Home	Yes	33%	13%	89%	88%
	No	67%	88%	11%	13%
Ridematching Services	Yes	20%	13%	44%	69%
	No	80%	88%	56%	31%
Shuttle Service	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Bike Subsidy	Yes	0%	0%	0%	0%
	No	100%	100%	100%	100%
Walking Subsidy	Yes	0%	0%	38%	40%
	No	100%	100%	63%	60%
Carpool Subsidy	Yes	0%	100%	33%	38%
	No	100%	0%	67%	63%
Vanpool Subsidy	Yes	100%	100%	56%	81%
	No	0%	0%	44%	19%
Transit Subsidy	Yes	100%	100%	56%	75%
	No	0%	0%	44%	25%
Ferry Subsidy	Yes	0%	0%	22%	19%
	No	100%	100%	78%	81%
Gen. Transportation Allowance	Yes	0%	0%	17%	56%
	No	100%	100%	83%	44%
Clothes Locker	Yes	0%	0%	78%	81%
	No	100%	100%	22%	19%
Uncovered Bicycle Parking	Yes	0%	0%	44%	56%
	No	100%	100%	56%	44%
Covered Bicycle Parking	Yes	100%	0%	67%	75%
	No	0%	100%	33%	25%
Passenger Loading Area	Yes	0%	100%	44%	44%
	No	100%	0%	56%	56%
Shower Facilities	Yes	0%	0%	89%	94%
	No	100%	100%	11%	6%

The Greater Redmond TMA is a private, not-for-profit Transportation Management Association that provides transportation services, commute trip reduction planning, and education to a consortium of major employers. The GRTMA has a current membership of 179, representing about 55,000 employees. Among the GRTMA's efforts is a comprehensive website with specific, detailed information on alternative commuting modes. In addition, the GRTMA operates Ridequest.com, a specialized ridematching service aimed specifically at commuters who work in Redmond.

Redmond's R-Trip program, essentially a head tax on employers, generates revenue that goes back into TDM programs.

Redmond's city code requires all new commercial (office or industrial) developments over a certain trip generation threshold are required to implement TMPs. The TMP requirements are generally similar to requirements for CTR affected employers.

Addendum A reviews the existing TMP's in the Willows Road study area.

Addendum A
TMP Summaries

Building TMP Programs

In Willows Road there are six TMP programs, two of these are summarized in the following paragraphs to present the general contents of the programs.

CarrAmerica-Willows Creek Business Campus

The peak periods used in the TMP are the hours of 7:00 to 9:00 am and 4:00 to 6:00 pm, Monday through Friday. The goal is to enact measures to reach 30% employee participation in commuting to work in commuter modes other than SOV's during the am and pm peak hours within 2 years of 70 percent occupancy. The terms and conditions of the TDM plan transfer with the property and are binding upon any subsequent owner of the property. Specific strategies/actions include:

- Membership in the Greater Redmond TMA
- Establish a ride-matching system
- Establish preferential parking for carpools and vanpools near employee entrances to building on the CarrAmerica site. Only "registered" carpools/vanpools will be allowed to park in these stalls. Register with the Transportation Coordinator who will pass out decals. Parking spaces are reserved from 6 am to 9 am and from 1:30 am to 1:30 pm Monday through Friday. At least 10 percent of the total spaces for vanpools/carpool parking.
- The CarrAmerica Buildings will be equipped with bicycle parking facilities that meet or exceed demand.
- Carr America will provide for one annual event to focus on transportation issues.
- CarrAmerica will issue a minimum $10 subsidy to reduce the cost of monthly transit passes
- CarrAmerica will encourage users to participate in the planned two-year shuttle program that will provide service within walking distance of the buildings. CarrAmerica's two-year contribution is $125,000 for this program.

Annual Program Review

Progress towards the goals of the TMP will be reviewed and reported annually. A report will be submitted to the City of Redmond yearly.

In the event that the stated goal of 30 percent reduction of all single occupancy vehicles is not achieved by the fourth year of 70 percent occupancy.

Annual Required Report (January 30, 2002)

The report summarizes the items listed in the plan. There is no information about the number of people using the carpools/vanpools spaces or alternative modes to commute to work.

Willows Commerce Park Phase 3

There are two buildings covered with this agreement. Building D is an office/warehouse building. Building E is a three-story office building. (Are these built of not). The peak hours are defined from 6am to 9 am and from 4 pm to 6 pm. The goal of the TMP is within one year of implementation, maintain a commute pattern during substantial occupancy (when at least 70 percent of building floor area is leased and used by tenants), where 30 percent of the employees commute using other than an SOV during the peak hours. Implementation will begin when there are at least 25 tenant employees onsite. The strategies and actions are as follows:

- Appoint a site Transportation Coordinator to conduct these activities and promote the program
- Annual Special Transportation Day
- Establish a permanent Commuter Information Center
- Establish a ride-matching service
- Establish preferential parking for carpools and vanpools near employee entrances to building on the WCP3 site. Only "registered" carpools/vanpools will be allowed to park in these stalls. Register with the Transportation Coordinator who will pass out decals. Parking spaces are protected for carpool and vanpool use only during AM and PM peak hours and lunch hours Monday through Friday. Visitors may use the preferential spaces at other times. The initial number of spaces will be at least two in front of each tenant with 50 or more employees, and one in front of each tenant with less than 50. As these spaces are assigned, additional spaces of up to 10 percent of the total employee spaces will be marked for vanpools/carpool parking.
- Bicycle racks will be provided; at least one per 50 employees
- A financial contribution to the Shuttle Bus system in the amount of $66,528 will be made when implementation of this TMP begins
- Retain membership in the Greater Redmond TMA
- Contribute $20,000 annually for ten years to a fund to be used for a "Commuter Club" to be established by Metro or the STC. The program will provide points tradable for vouchers which are redeemable at participating retail stores.